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AUTHOR McNair, Kathleen: Joyce, Bruce
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ABSTRACT

This study of teacher decision-making behavior investigated ten elementary teachers' teaching styles, decision-making behavior, and concepts of students. Each teacher was videotaped six times at intervals over the school year. The teachers viewed the tapes and at various points were asked to describe what they believed they were thinking about at the time. These descriptions were analyzed and categories of concern emerged. In order of significance the concerns reported were: content of the lesson, procedures, time, and materials. Concern with pupil learning, attitudes and behavior accounted for nearly forty per-cent of the total, and concern with learning tasks, facts, and ideas for nearly thirty per-cent. Concerns were relatively stable across time, and individual differences between teachers were relatively small. The effect of these concerns on teaching style are discussed. Teachers tended to make "fine tuning" adjustments within the recitation pattern of teaching rather than make major changes in teaching strategy. (Authors/JD)

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TEACHERS' THOUGHTS WHILE TEACHING:

THE SOUTH BAY STUDY, PART II

Kathleen McNair and Bruce Joyce

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Abstract

This study of teacher decision-making behavior is part of the South Bay Study which investigated 10 San Francisco Bay Area elementary teachers' teaching styles, decision-making behavior, and concepts of students. The purpose was to generate paradigms for the study of how teachers think as they teach.

Stimulated recall interviews were used in this portion of the study. Each teacher was videotaped six times at intervals over the year. The tapes were then played back to the teachers, who at various points were asked to describe what they believed they were thinking about at the time. These descriptions were analyzed and *categories of concern* emerged.

The pattern of these categories of concern showed that while teachers make "fine tuning" adjustments in instruction within the recitation pattern of teaching, they do not make major alterations. Not once in an entire series of lessons was a teacher observed making a major change in teaching strategy. Instead, teachers continuously "read" pupil responses to learning tasks and made minor adjustments.

In order of significance the concerns reported were: content of the lesson, procedures, time, and materials. Concern with pupil learning, attitudes, and behavior accounted for nearly 40% of the total, and concern with learning tasks, facts, and ideas for nearly 30%. Little concern over objectives was voiced. The concerns were relatively stable across time, and individual differences between teachers were relatively small.

The overall pattern of concerns is consistent with the recitation method of teaching being employed. The teachers appeared to have generated a field of forces which brings concern with pupil response to learning tasks to the surface.

AN INTRODUCTION TO THE SOUTH BAY STUDY¹

Greta Morine-Dershimer and Bruce Joyce²

Studies of teaching have, for the most part, concentrated on the visible events in classrooms and other places where teaching takes place. Over 100 systems have been developed to record and categorize teacher and student behavior in a variety of ways.³ The use of these systems has resulted in a growing field of knowledge about the visible behavior of teachers and students as they interact with one another.

Teaching as Behaving: The Visible Acts

The results of inquiries into teaching can be interpreted from several points of view.

One interpretation suggests that extremely strong normative pressures operate to shape teaching behavior. These pressures have great force in the early years of a teacher's career (including the training period).

¹This introduction is included, in its entirety, in all four IRT published reports on the South Bay Study: Teaching Styles at South Bay School: The South Bay Study, Part I (Res. Ser. No. 57), B. Joyce and K. McNair; Teachers' Thoughts While Teaching: The South Bay Study, Part II (Res. Ser. No. 58), K. McNair and B. Joyce; Teachers' Conceptions of Pupils: The South Bay Study, Part III (Res. Ser. No. 59), G. Morine-Dershimer; and Teacher Plan and Classroom Reality: The South Bay Study, Part IV (Res. Ser. No. 60), G. Morine-Dershimer.

²The researchers in the South Bay Study were Greta Morine-Dershimer of Syracuse University, Bruce Joyce of Booksend Laboratories, and Kathleen McNair of the California State Department of Education.

³See Anita Simon and Gil Boyer (Eds.), Mirrors for Behavior. Philadelphia: Research for Better Schools, for a compendium of instruments.

They move teachers toward what Hoetker and Albrand (1969) have termed a "recitation style"⁴ of teaching. This interpretation emphasizes the finding that many teachers appear to use similar approaches (usually variations on the recitation style).

Other researchers have reported that variety in teaching is associated with pupil learning (e.g., Flanders, Note 1), suggesting that those who are not completely co-opted into the recitation style are more effective teachers because their wider repertoire enables them to reach more learners and pursue more goals than those who use only one style.

Dunkin and Biddle (1974) have organized their research somewhat differently, providing a picture of the relationships between variations in teaching style and skill and measures of effectiveness (usually measures of student learning). These authors are generally pessimistic because correlations between measures of teacher behavior and student learning are frequently quite low.

Rosenshine (1971), on the other hand, has taken an optimistic view, emphasizing that a number of studies of certain teaching "skills" report positive correlations with measures of student learning.

Gage (1978) presents research on teaching as a growing base of understanding. He believes that teaching is a complex art which science informs gradually. To expect a few dimensions of teaching to correlate directly and highly with any few measures of pupil learning, he says, belies both its many-sidedness and the state of development of inquiry into it.

Gage's view that teaching is complex, and that concepts describing it will have to reflect that complexity is supported by the findings of

⁴ A style in which the teacher asks questions to elicit knowledge of facts, and the student responds in kind (Hoetker & Albrand, 1969).

several recent studies. For example, McDonald and Elias, Note 2) and Berliner (1976), in separate phases of the same large, long-term investigation, report evidence that clusters or patterns of teacher behaviors may be associated with complexes of variables of student achievement. They suggest that single aspects of teacher behavior are unlikely to be powerful determinants of student learning.

There are still other questions about stability of teaching styles, that is, how consistently teachers behave over time. Medley (1977) has reported that a number of teaching style dimensions are relatively stable (that measures of teaching behaviors at one point in time are correlated with those measures at another point in time). Shavelson (1976), on the other hand, argues that the correlations between aspects of teacher behavior across time are moderate -- too low to permit characterization of teachers in terms of style regularities. We (the South Bay Study researchers) believe that certain aspects of teacher behavior are reasonably stable across time (Medley's position), and that there are probably clusters of teacher behavior which are related to certain aspects of student achievement (McDonald & Berliner's opinion). Research must go a long way, however, before causal relationships can be established between important dimensions of teacher behavior and student achievement, even though knowledge is accumulating.

Teaching as Thinking: The Inner Acts

In sharp contrast to the large amount of research on the observable aspects of teaching behavior is the tiny quantity that has been devoted to the study of how teachers think -- how they process information. What do teachers think about the individuals they interact with? What kinds of decisions do they make? What kinds of information do they receive from the

confusing world of the classroom, and how do they deal with that information? How do teachers plan lessons and units? What constraints do they perceive? How many alternatives do they consider? How do they categorize their students and why?

Most of the tiny group of studies on teacher thinking have not been designed from a naturalistic point of view. Zahorik (Note 3) points out that planning has typically been studied from a prescriptive stance, focusing on ideal models and recommendations rather than how teachers in practice typically prepare for lessons. For example, much research on preactive decision making has assumed that teachers diagnose student learning, develop behavioral objectives, and otherwise follow classic "instructional-systems" models. But naturalistic investigations have indicated that very few teachers actually use such a behavioral analysis in preparing for their lessons (Popham & Baker, 1970).

Fifteen years ago, Joyce and Harootunian (1966), studying the decision-making processes of preservice teacher candidates, discovered that the major decisions were made in relation to instructional materials for children. The teachers' major sources of information about science came from children's literature rather than from adult-oriented books or manuals that accompany the instructional systems prepared by textbook publishers. Scientific knowledge about the kinds of information that teachers use for making "inflight" decisions is almost nonexistent.

Except for the investigations by Clark and Joyce (1979), Crist, Marx, and Peterson (Note 4), and Morine-Dershimer and Vallance (Note 5), there have been almost no studies of information processing during teaching prior to this study. Thus, although overt teacher behavior has been subjected to analysis by numerous category systems, there are few ways of classifying the kinds of teacher thinking that go on regularly during the course of teaching. Yet, until the thoughts and feelings which occur

during teaching are explored, the visible observed behaviors may not be understood.

When a teacher asks a question, an observer can record the visible behavior clearly enough without understanding the mind that formulates the question. However, the result is only a record. Unless the thought behind the utterance is known, little can be known about what caused it. If researchers and educators care to use information about teaching as a basis for improving it, they need to understand *why* teachers behave as they do.

The investigation reported here builds on this limited body of research to explore and try to explain relationships between the teaching styles of a small group of teachers in one school and the types of information those teachers seek and use as they teach.

Relationship to Prior Studies

The South Bay Study builds directly on two prior studies, one directed by Joyce at Stanford University (Clark & Joyce, 1979; Crist, Marx, & Peterson, (Note 4), and one conducted by Morine-Dershimer at the Far West Laboratory for Educational Research and Development (Moline & Vallance, Note 5; Morine-Dershimer & Vallance, Note 6).

The Stanford study examined teacher decision making in a laboratory setting. Twelve teachers taught new instructional units to junior high school students previously unknown to them. They taught each unit to three different groups of eight students each on three different days. Teacher planning (Peterson, Marx, & Clark, Note 7), interactive decision making (Clark & Peterson, Note 8), and teacher judgment of pupils (Marx, Note 9) were all examined in this study.

The Beginning Teacher Evaluation Study (BTES) conducted by the Far West Laboratory examined teacher decision making in a semi-controlled setting. Forty elementary school teachers identified as "more effective" or "less effective" (Berliner, Note 10) taught two lessons based on curriculum content new to them to a randomly stratified sample of pupils from their own classrooms; later, they engaged in some simulated planning tasks. Teacher planning (both short-term and long-term), interactive decision making, teacher judgments of pupils, teacher judgments of other teachers, and pupil perceptions of teachers were all examined.

The Stanford and BTES studies used somewhat different techniques to collect data on teacher decision making, and arrived at complementary findings. The South Bay Study incorporated some data collection procedures from these earlier studies, as well as instituting some new procedures. The similarities and differences are described here to illustrate the continuity of these three studies.

The Investigation of Short-Term Planning

In the study directed by Joyce at Stanford, teachers were given new curriculum materials and a period of time in which to plan a day's unit of instruction. The teachers were asked to "think aloud" as they planned; their oral planning was tape recorded and later coded under categories such as objectives, materials, subject matter, and process. The study's results indicate that teachers spent most of their planning time dealing with content to be taught. The teachers' second largest area of concentration was on instructional processes (teaching strategies and lesson activities). The smallest proportion of their planning time was spent on identifying lesson objectives.

In the BTES, Morine-Dershimer collected teachers' written plans for two lessons in mathematics and reading, both dealing with content provided by researchers and new to teachers. These plans were analyzed

to determine degree of specificity, type of format, amount of attention to goals, pupil readiness, evaluation procedures, and alternative procedures. Teachers tended to be fairly specific in their written plans and used an outline format, but they included very few statements regarding behavioral goals, diagnosis of student needs, evaluation of learning, or possible alternative activities. The "more effective" teachers made more specific statements in their written plans, and mentioned instructional processes to be used more often than the other teachers did.

In the South Bay Study, teachers planned and taught lessons in reading, following the curriculum they normally used, to groups of pupils in their own classrooms. These teachers were interviewed about their plans in the morning before their reading lessons began. They described their general plan, and then answered questions about diagnosis of pupil needs, use of instructional materials, specific lesson objectives, teaching strategy, and seating arrangements. While diagnosis of pupil needs, lesson objectives, and seating arrangements were seldom mentioned in the initial plan statements, teacher responses to probing questions clearly demonstrated that these aspects of the lessons were not being ignored but rather, were part of their "mental image" or set of expectations for the lesson.

The Investigation of Interactive Decision Making

In the Stanford study, interactive decision making was investigated by use of a "stimulated recall" technique. An interviewer showed each teacher four brief (two to three minutes long) videotaped segments of classroom interaction, randomly selected from a 50-minute lesson. After viewing each segment, the teacher answered a series of questions, as follows:

1. What were you doing here?
2. What were you noticing about pupils?
3. Did you have any instructional objectives in mind at this point?

4. Were you considering any alternative actions here?
5. Was there anything in this situation that caused you to behave differently than you had planned?

The principal findings were: (1) teachers considered alternative strategies only when the lesson was going poorly, (2) the primary cue used to judge how well the lesson was going was student participation and involvement, and (3) teachers rarely changed from their planned strategy, even when instruction was going poorly.

The BTZS also used a stimulated recall technique to explore interactive decision making. But in this case the entire 20-minute lesson was videotaped and played back to the teacher, who was instructed to stop the tape at any point at which s/he was aware of having made a decision. In addition, the interviewer stopped the tape at a point where a pupil gave an incorrect answer and a point where there was a transition from one activity to another. At each decision point the teacher was asked:

1. What were you thinking about here?
2. What were you noticing that made you stop and think?
3. What did you decide to do?
4. Did you consider any alternatives?

The decision points identified by teachers in this study were related mainly to interchanges (decisions stemming from immediate verbal interaction) or planned activities (interactive decisions stemming from preactive decisions). Teachers focused on instructional process in discussing the substance of their decisions, but shifted to a focus on pupil characteristics when discussing the basis for these decisions. Few alternatives were considered. The "less effective" teachers tended to mention a larger number of items that they were taking into account on almost all aspects of decisions discussed than the "more effective" teachers. That is, they appeared to be attempting to process more information at a given

decision point than the "more effective" teachers.

The South Bay Study incorporated some techniques from both previous studies in conducting stimulated recall interviews, as well as adding some new investigative procedures. A teacher was videotaped during two reading lessons on the same day, one with a high ability group, and one with a low ability group. At the end of the day both lessons were played back to the teacher, first using two random stops for each lesson (as in the Stanford study), then playing the entire lesson back, stopping the tape at teacher-identified decision points (as in the BTES). Interviews were conducted at four different points in the school year, to investigate changes over time. Interactive behavior during lessons was observed and coded to compare teacher decision making with classroom behavior.

The Investigation of Teacher Judgments About Pupils

Teachers in the Stanford study were asked after each new lesson they taught to predict the rank-order of their students in that lesson on a cognitive achievement test and an attitude inventory, which were administered after the third teaching episode. (The students were unknown to the teachers before the lesson, and each lesson was taught to a different group of pupils.) In addition, teachers were asked to describe the student cues they used in making these predictions. The most frequently mentioned cue was "student participation." Regression equations using the behavioral cues identified by teachers were not good predictors of actual student achievement or attitude inventory results. Findings suggested that teacher judgments about student attitudes were more accurate than their judgments about cognitive achievement.

In the BTES, a "pupil sort task" was used to explore teacher judgments about pupils. After teaching two new lessons to their students, teachers were asked to sort their pupils into groups based on something

they had observed about pupils during the lesson. The procedure was repeated until the teacher could think of no new basis for regrouping pupils. The most frequently used basis was pupil participation. The "more effective" teachers generated more groupings using cognitive characteristics as bases for categorizing, and also formed more groups where a pupil was singled out as being too different on a given characteristic to be grouped with other pupils.

The South Bay teachers were interviewed using the pupil sort task at five different points in the school year; this was done to explore changes over time in pupil characteristics being observed. Teachers were asked to predict pupil success in reading three times (September, November, and June). These predictions were compared to pupil performance on standard achievement tests to determine "accuracy" of teacher judgments. The predictions were compared to teacher rankings of pupils on other teacher-identified pupil characteristics to identify the cues used by teachers in making predictions.

The Continuity of Investigation

The three studies can be viewed as a series of investigations which explore a basic set of questions, using somewhat different research settings and data collection techniques. The findings of the first two studies complement and support each other in important ways. The findings of the South Bay Study extend, refine, and throw new light on the findings of the earlier exploratory studies. In addition, the results of the South Bay Study suggest new questions for future research.

The Purpose of the South Bay Study and Background Information

Our major objective in this study was to develop one or more paradigms for viewing the ways that teachers process information, and

to generate and adapt methodologies by which information processing can be studied efficiently and comprehensively. The South Bay Study is essentially a case study of a single elementary school in a large metropolitan area. It focuses on the variety and stability of the information-processing behavior of 10 teachers.

The South Bay School is staffed by 20 teachers, a principal, an assistant principal, and two secretaries; it is served by three specialists who are shared with other schools. The school qualifies for extensive ESEA Title I (federal) and SB 90 EDT (state) funds by virtue of the economic conditions of its neighborhood.

In recent years, state and national funds have resulted in teachers' participation in the selection and purchase of extensive instructional materials, especially in the areas of reading and mathematics. These include self-instructional stations for reading and arithmetic, "concrete aids," "supplementary readers," and a variety of audiovisual materials and "skill-builders."

The 10 teachers who participated in the study teach grades one to five. One of them was male; nine were white and one was black. All 10 teachers had taught for at least three years. Teachers designated as 101, 102, and 103 taught first-grade; Teachers 104 and 105 taught third grade; Teacher 106 taught fourth-grade; Teachers 107 and 108 taught fifth-grade; and Teachers 109 and 110 taught special education.

Study Design and Methodology

The South Bay Study examined three aspects of teacher behavior and thinking:

1. Interactive teaching styles, as revealed by observation of verbal interaction, including an examination of variations between teachers and stability of styles over time.

"How do the teachers teach?" "How are they similar?" "How do they differ?" "How consistently do they teach?"

2. Thought processes while teaching, as revealed through "stimulated recall" techniques.

"What do they think about as they teach?" "How similarly (differently?) do they think?" "How consistent are their thoughts over time?"

3. Teacher conceptions of pupils, as revealed by categories used to describe students and predict their behavior.

"How do they describe the children?" "How similarly (differently?) do they perceive the children?" "How (and how well) do they predict performance?"

The Investigation of Teaching Styles

Each of the 10 teachers was observed 12 times in the course of the 1976-77 year for a total of 120 observations.

Observers were trained to use a complex category system developed over the years that is sensitive to variations in teaching style and strategy.⁵ Data collected were analyzed to describe similarities and differences among teachers and across time, to determine stylistic differences between curriculum areas, and to determine whether the transactions between teachers and students varied with student ability. The purpose of this aspect of the investigation was to develop a picture of the teaching going on in the school, and its stability and variety.

The Study of Information Processing

Altogether, 60 lessons were videotaped as the teachers worked. Each of these tapes was played back to the teacher concerned and s/he was interviewed to recapture the thoughts that were in his/her mind as events occurred during the videotaped episode. The protocols derived from these "stimulated recall" interviews formed the basis for the descriptions of interactive information processing. Analysis of these protocols focused on the content of the recalled thoughts and was structured to determine similarities and differences among the teachers and across time, between subject areas, and between ability groups of students. In addition, we

attempted to determine relationships between teachers and decision making styles.

We also interviewed teachers to determine their perceptions of their own teaching styles and information-processing behavior. Characterizations were developed of the teaching and information-processing styles of each teacher, and these were reported to the teacher for confirmation or disconfirmation.

Conceptions of Pupils

On five occasions throughout the school year, the teachers were asked to categorize their students and describe the bases they used for observing the children as they worked with them (what cues they used, how they put together those cues to describe the children, and the meaning of these descriptions for their teaching decisions). These data were analyzed to determine normative tendencies, differences between teachers, and the stability of characterizations of the students across time. We also analyzed the data to try to learn how teachers arrived at their characterizations of students, whether or not changes resulted from continued exposure to the children, and the influence of a variety of sources of information about pupils (direct observation, conferences with parents, test scores, etc.).

Organization of the Report

The report of the South Bay Study is organized into four separate papers:

1. The Teaching Styles at South Bay School: The South Bay Study, Part I by B. Joyce and K. McNair. This paper focuses primarily on the general patterns of teaching styles in the South Bay School. The patterns exhibited are those of the "recitation method," or in current parlance, "direct teaching."

2. Teachers' Thoughts While Teaching: The South Bay Study, Part II

by K. McNair and B. Joyce. This paper examines teachers' thought processes while teaching. Stimulated recall interviews of teachers were used to obtain data for analysis.

3. Teacher Conceptions of Pupils -- An Outgrowth of Instructional

Context: The South Bay Study, Part III by G. Morine-Dershimer. This paper reports the general patterns of teacher processing of information about pupils, including teacher conceptions of pupils and predictions of pupil success. The influence of the instructional context on teacher information processing is highlighted.

4. Teacher Plan and Classroom Reality: The South Bay Study, Part IV

by G. Morine-Dershimer. This paper focuses primarily on an analysis of relationships among interactive behavior, interactive decision making, and interactive processing of information about pupils within specific lessons. The influence of the discrepancy between the teacher's expectations and the actual events in the lesson on teacher decision making is illustrated in three case studies.

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Teachers' Thoughts While Teaching:
The South Bay Study, Part II

Kathleen McNair and Bruce Joyce¹

As knowledge about teaching effectiveness has increased, so have expectations for teachers. They are asked to balance learning objectives, student characteristics, teaching skills and strategies, and curriculum materials in ways which will optimize teaching effectiveness. It is left to researchers to unravel the psychological process that binds these aspects of teaching together -- the process of teacher decision making (Clark & Joyce, Note 1).

Teachers make decisions that pertain to both immediate situations and the distant future. Short-term decisions include *preactive decisions*, those which take place shortly before instruction begins, and *interactive decisions*, those which occur during the instructional process. This distinction was introduced by Philip W. Jackson in "The Way Teaching Is" (Jackson, 1974) and allows examination of short-term decision making as it occurs in two somewhat different situations.

This paper presents the part of the South Bay Study concerned with interactive or "inflight" teacher decision making. This includes decisions about such immediate problems as who to call on, how to provide corrective feedback, when to discipline a student, or how fast to proceed through a lesson.

¹Kathleen McNair works with the California State Department of Education in Sacramento, California. Bruce Joyce is the director of Booksend Laboratories in Palo Alto, California.

Research literature on teachers' interactive decision making is sparse, and scientific knowledge about the kinds of information or cues that teachers use when making these decisions is almost non-existent. The recent investigations by Clark, Peterson, Marx, Joyce, and Morine-Dershimer generated the antecedents of the methodology we used (see "An Introduction to the South Bay Study," which is included in this publication).

Marx and Peterson (Note 2) report findings from a controlled laboratory experiment in which both preactive and interactive decision making were examined. Since this was a pioneering effort, method and potential associations with other teacher and student variables were focused upon. Stimulated recall interviews were used to assess teachers' thinking during the lessons. To code the audio tapes of the interviews, the Teacher Decision Making Coding System was devised, but we found it was insufficiently sensitive to differences in teacher decision making. In light of the preliminary nature of this work, we declined to make generalizations concerning decision making or the relationships between these styles and teacher behavior or student outcome.

Method

Subjects

As described in detail in the *Introduction*, 10 teachers participated in the study as informants about their thinking and decision-making processes. There was only one male teacher. There were nine white teachers, and one black teacher. All had taught for at least three years. The teachers are designated numerically. There were three first-grade teachers: 101, 102, and 103; two third-grade teachers: 104 and 105; one fourth-grade teacher: 106; two fifth-grade teachers: 107 and 108; and two special education teachers: 109 and 110.

Design

This was a descriptive study. We hope any significant associations among the variables or differences between teachers will lead to future hypothesis building. To investigate the effect of time on teachers' interactive decision making, interviews were done in fall, winter, and spring. To focus on a major subject area, only reading lessons were observed. Because most of the teachers used a staggered reading system in which the less advanced students came earlier in the morning for reading, and the more advanced students stayed later in the afternoon, we were able to compare lessons for both groups. The data source was comprised of 60 interviews (2 lessons x 3 times during the year x 10 teachers).

Procedure

The method used throughout the investigation consisted of stimulated recall interviews between an investigator and a teacher, using a videotape of a lesson the teacher had just taught.

On a day previously arranged, the investigator videotaped both the morning and afternoon reading lessons. If three investigators participated, as many as three teachers could be videotaped in one day. All 10 teachers were videotaped as close to the same time as possible. As soon as school adjourned, an audio tape recorder, a videotape recorder and playback unit, and a monitor were moved into the teacher's classroom, and the stimulated recall interview began.

The teacher sat in front of the monitor while the interviewer sat to the teacher's side, next to the playback unit. The audio tape recorder was used to record the interview.

The teacher was instructed to stop the tape whenever s/he remembered hesitating, assessing the situation, or making a decision. In addition, the interviewer stopped the tape at four points for each lesson: (1) the first time a pupil gave an incorrect answer to a teacher question, (2) the second or third time the teacher shifted the activity in which the pupils were engaged, and (3) and (4) at two randomly selected points. After the tape was stopped, the interviewer asked the following questions:

1. What were you thinking at that point?
2. What did you notice that made you sort of stop and think? (If necessary, add: Was there anything pupils were doing that made you sort of stop and think?)
3. What did you decide to do?
4. Was there anything else you thought of doing at that point, but decided against?
5. What was it?

The same probes were used for stops initiated by both the teacher and the interviewer. The videotape was stopped at two random points, and the interviewer ascertained whether or not a decision was being made. Then, the tape was rewound and played from the beginning and investigators and teachers stopped the tapes whenever they believed a decision was taking place.

Coding

The protocols were coded using a category system we devised after participating in and reviewing several interviews. It consists of five major categories of teacher concern, each of which is broken down into more specific subcategories (see Appendix). One coding sheet was used for each interview.

We found that when the teacher stopped the videotape, s/he was as likely to describe his or her thinking as to discuss a clear-cut decision-making event. We decided to code these thought processes as well as the instances in which the teachers actually engaged in decision-making

behavior. Thus the focus of the study changed slightly. Rather than concentrating purely on teachers' interactive decision-making behavior, we also examined their interactive information-processing strategies and thinking patterns. The data more adequately answered the question: What are teachers thinking about as they teach?

Whether commenting on the ongoing activity or remarking on an actual decision, it was the concerns² addressed as the teachers explained their reason for stopping the tape that were coded.

The five major categories of teacher's concern are pupil, lesson content, procedures, time, and materials. Descriptions of the more specific subcategories are presented in the Appendix.

Results

Sixty coding sheets representing 60 interviews were used in the analysis of the data. An interview was considered the unit of analysis. (The interviews were conducted to simulate a 10 x 2 x 3 repeated measures design.) Factors under investigation were the teacher, student ability (higher and lower), and time (fall, winter, and spring).

Through the use of tallies, the total number of times a particular type of concern was mentioned during an interview was recorded on the coding sheet, as was the teacher ID number, the date, and students' ability level as measured by a combination of tests and teacher judgments. If a teacher mentioned more than one type of concern during a stop, each type mentioned received a tally. Thus, the number of concerns recorded for an entire interview may not necessarily equal the number of stops made.

Productivity

First, we examine the volume of the data. A total of 1,249 concerns

²In this paper, "concern" refers to an aspect of the lesson that a teacher found remarkable or wanted to affect by his/her decision.

were coded from the 60 interviews, which indicated an average of between 20 and 21 concerns mentioned per interview. The average number of concerns mentioned by a teacher after the series of six interviews was very close to 125, while the standard deviation was about 41. The average number of concerns for a particular set of lessons was close to 208, also with a standard deviation of approximately 41.

Types of Concerns and Relative Weights

We examined how the 1,249 concerns mentioned were distributed among the categories. Table 1 lists each category and the number of times it was mentioned.

The teachers were most affected by their concern for the pupil and based many of their decisions on what they surmised was happening with the individual student. Content accounted for the bulk of the remaining concerns voiced. Teachers apparently focused much of their attention on what was occurring during the lesson, i.e., what the students were hearing, saying, doing, and feeling. The other major areas of concern did not receive nearly as much overall attention.

Pupil learning was most frequently on the minds of these 10 teachers. They were concerned that the student master what was before him or her. Not surprisingly, then, the task is the second most popular concern. These teachers closely monitored the various aspects of tasks to ensure appropriateness. Third, the teachers were concerned with the facts and ideas embedded in, or relevant to, the lessons and their appropriateness. And, following that, the teachers focused their concern on pupil attitudes in an effort to bring about positive feelings toward the learning situation. The ranking of the remaining categories is obvious from Table 1.

Table 1: Total Number of Concerns Mentioned per Category

Category	Number of Concerns Mentioned
Pupil	490
learning	291
attitudes	128
behavior	70
Content	395
task	188
facts and ideas	170
objectives	37
Procedures	172
directions	87
modifications	55
scheduling	30
Materials	110
instructional systems	76
teacher-developed aids	34
Time	83
time block restrictions	38
pacing	28
time-related goals	17
Total	1249

Effect of Time

One question of interest is the effect of time on the volume and distribution of concerns among the categories. The total number of concerns mentioned for a particular part of the year was broken down by teacher. Most teachers made more comments in fall than in winter, and (except for Teacher 109, a special education teacher) more comments in spring than winter (33% of the total number of concerns were voiced in the fall, 28% in the winter, and 39% in the spring). It appears that increasing familiarity with the process did not induce a steady increase in productivity.

After standardizing the data by changing the number of times a particular concern was mentioned to a proportion of the total number of concerns mentioned during the interview, we were able to examine the stability of concerns over time. We conducted a one-way analysis of variance and used Hartley's $F_{\max}$ test to test for homogeneity of variance. Our results indicated that frequency of mention of a particular concern did not change over time. Spearman rank order correlations were computed for the position of each category in terms of frequency of mention by all teachers. The results confirmed the stability of emphasis placed on each category by the South Bay teachers over time.

Individual Differences

Differences between teachers with respect to the distribution of concerns among the categories were examined. A one-way analysis of variance was performed for each category, and F-ratios were determined, to identify the differences. The Newman Keuls technique was used to find out which teachers mentioned a particular concern significantly more or less often than the other teachers. In addition, Spearman rank order

correlations were computed for each teacher with every other teacher, using frequency of mention per category as the ranking criterion.

Teacher 108 (fifth-grade) was significantly less concerned with pupil learning than were Teachers 109, 110, 101, and 102 (two special education, and two first-grade teachers, respectively). On the other hand, Teacher 102 was significantly more concerned with pupil learning than were Teachers 108, 107 (special education), 103 (first grade), 104 and 105 (third grade), and 106 (fourth grade). In regard to concepts, Teacher 110 had a significantly higher mean -- showing greater concern -- than did Teachers 108 and 101. Teacher 101 expressed less concern with directions compared to Teachers 105 and 108, who expressed the most concern. Regarding modifications, Teacher 107 was less concerned than were Teachers 105 and 106. For the category of pacing, no significant differences were indicated. With regard to time-related goals, Teacher 107 was significantly more concerned with instructional systems, than were Teachers 108, 110, and 103. Teacher 108 expressed significantly more concern about teacher-developed aids than did Teachers 106 and 104.

Apparently, most of the teachers shared common concerns and attributed the same priorities to them. The teachers did not differ a great deal between themselves with respect to what they attended to as their lessons proceeded. They appeared to be working out of a standard framework that emphasized learning rather than thinking, task-directedness, and teacher dependency.

Those teachers who deviated from the central tendency did so because they concentrated on one aspect within the standard framework to the exclusion of most of the others. For example, because Teacher 105 (third grade) was focusing on adjusting the learning environment to the students, goals and long-range plans were not attended to. Because Teacher 108

(fifth grade) was mostly concerned with management, student learning and variations in class routines were of low priority. Because Teacher 101 (first grade) was mostly concerned with the individual needs and progress of each student, management and group concerns declined in importance. Despite some apparent deviation, however, these teachers appeared to be more alike than different with respect to what concerns them during a lesson.

Ability Level of Students

We examined the effect student ability level had on teachers' interactive decision-making patterns. There was a tendency toward mentioning more concerns during lessons with less-advanced reading groups than with more-advanced reading groups. We found a similar tendency for four out of the six teachers who divided their reading groups by ability.

Differences by category between reading lessons with higher and lower ability students were investigated using the seven most frequently cited categories. Only interviews with those teachers who regarded their afternoon groups as more able readers were used in this analysis. Those interviews with teachers watching themselves teach the morning group comprised the lower group; those interviews with teachers watching themselves teach their afternoon group comprised the higher group. There were 18 interviews in each group. The means for each group for each category were calculated.

Although none of the means differed significantly, it appeared that these six teachers tended to be more concerned with pupil behavior, effectiveness of directions, appropriateness of concepts, and pupil attitudes when teaching their lower groups. When teaching higher ability students, these teachers appeared to be slightly more concerned

with the appropriateness of the task and with pupil learning. Concern with instructional systems did not differ for either group.

Teachers showed more individuality here than we have noticed previously. In all but two categories, directions and pupil behavior, we found differences that favored both groups. It appeared that these teachers as a whole may not have seen these groups of children exactly the same. But of equal interest is the notion that these teachers, who appeared to be so alike in so many ways, differed in what they were sensitive to given a specific ability group. For example, Teacher 107 (fifth grade) was not nearly as concerned with pupil learning in the high reading ability group as she was in the lower group. Teacher 106 (fourth grade) was twice as concerned with pupil learning in the slower group. The pattern, however, was reversed with respect to pupil attitudes. Teacher 107 was far more concerned about attitudes among her slower pupils than among her higher group, while Teacher 106 was more concerned about attitudes in her higher group. Other teachers showed similar individual patterns. Teacher 108 (fifth grade), for instance, differentiated between ability groups with respect to four categories, but in only one of these, concepts, did she exhibit more concerns when working with her higher ability group. Grade level could contribute significantly to teacher differences and would certainly need to be taken into account in further investigations.

Discussion

A specific question like "How often did these teachers make decisions during 20 minutes of teaching?" is difficult to answer using our data. We could not assume that the teachers recalled or interrupted for every decision they made. However, we were able to determine productivity (the number of concerns teachers were able to discuss

during the interview) and compare teachers on that dimension. The South Bay teachers were dissimilar in terms of productivity. Some were aware of, and may, in fact, have made many more decisions about immediate concerns than others.

Why such a difference exists deserves some theoretical consideration. Some teachers may be more shy in an interview situation; some may not know how to discuss their interactive decisions; some teachers may have established such a routine that interactive decisions do not occur very often.

The kinds of things the teachers noticed and/or made decisions about tended to be global, adhering closely to the traditional recitation model of teaching. The range of concerns spread across several aspects of teaching, but the bulk of the concerns were concentrated on the pupil and the task at hand. The teachers seemed to be using some sort of reference model against which they checked the ongoing activity. The teachers paid close attention to what went on, but their reference model did not seem to be a complex one; very rarely was a particular teaching theory mentioned. Learning other than factual mastery (for instance, transfer, discovery techniques, application) was seldom mentioned. Reading may not be an area which readily fits a more complex reference model, or perhaps teachers may not feel a need for a more complex reference model.

The 10 teachers tended to be more alike than different with respect to what they noticed and made decisions about. There was very little individual variation. This may be an artifact of holding the subject matter to reading, or it may be the result of a more universal adherence to a certain type of teaching. It may also be that the categories are

too general to discriminate between these teachers and that variation would occur at a more specific level.

Productivity did not vary systematically with time of year, but eight of the 10 teachers were equally or more productive in the spring than in the fall. It is possible the teachers were actually making more interactive decisions in the spring as a result of less preactive planning, more familiarity with students, more student input, or other factors. Or, it is possible teachers were more aware of themselves making interactive decisions. Also, they might simply have been more used to the interview process and less inhibited about speaking out. Being least productive in the middle of the school year is more difficult to explain and may be an artifact of the South Bay Study.

Time appeared to have no effect on the emphasis given to each category in relation to the other categories; teachers were concerned about the same things to about the same degree throughout the year.

Pupil ability appeared to have little effect on productivity or category emphasis. The bulk of teacher concerns fell within the same seven categories for each group. How they fell differed by group for some teachers, but the differences were not always in the same direction. This may indicate some individual variation with regard to implementation of the universal reference model, if such a model exists. How and why perceived ability level might affect interactive decision making deserves further research.

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Appendix

Categories of Teacher Concern

Pupil

Pupil learning. This encompasses teacher concern with a group of students or an individual student's acquisition of factual information, concepts, or theories being presented in the lesson. The concern could arise out of a general tendency for the student to be a slow or a fast learner, or it could come from a more immediate response to the particular lesson. For example, one teacher commented, "I knew she had it so I decided not to discuss it any further." Another teacher remarked, "He has a lot of trouble with his sounds, so though he seemed to have the idea, I decided to drill a little more."

Pupil attitudes. This includes those areas of concern that touch upon the more affective aspects of student response. These kinds of concerns can be with a student's tendency to maintain a particular attitude or with an immediate exhibition of a specific attitude. One teacher commented, "This little girl is shy and very sensitive. That's why I decided to call on other students after she gave me that answer, to make less of the fact that she didn't have it right." Several teachers mentioned the following: "He wasn't paying attention so I decided to call on him."

Pupil behavior. This refers to concerns that center upon how a student acts in the classroom. These concerns could be founded on a student's reputation for behaving or misbehaving, or they could result from the immediate situation. For instance, one teacher noted, "He is likely to

poke and bother the person next to him, so I decided to put him next to me." Or, as another teacher explained, "They were more excitable than usual today, so I tried not to let them get away with anything."

Lesson Content

Task. This addresses those concerns that relate to the learning activity in which the students are engaged. It includes such statements as "I at first wanted them to write their own stories, then changed my mind and had them write a group story."

Concepts. This includes those instances when a teacher focuses on a concept she wants the children to obtain from the lesson. A typical example of this type of concern would be the statement, "That's a difficult idea for kids this age, so I decided to take a little longer with it."

Objectives. This refers to concerns with the mastery of the knowledge and skills developed in the lesson. The comment, "I hadn't thought about it, but one of the things I wanted them to be able to do was rely on themselves. So instead of spelling a word for them, I had them look it up themselves." is representative of this category.

Procedures

Directions. This includes concerns that pertain to what the students are supposed to do to accomplish the task set forth in the lesson. They may be as simple as, "Read pages 100-110 in your reader," or as complex as an explanation of how to do a crossword puzzle. A teacher exhibiting this concern might say, "When I gave the directions, they weren't clear, so I decided to do the first one as an example."

Scheduling. This refers to those concerns that pertain to the order in which things happen during a lesson. A lesson may include more than one activity (e.g., individual seat work followed by a group reading session), or an activity may have several parts (e.g., a vocabulary review, a question and answer review of the study, and board work). A concern during the lesson with the order in which these occur would fall into this category. For example, one teacher commented, "Instead of discussing the story and then doing a vocabulary lesson on the board, today I decided to do it the other way around."

Modifications. This encompasses those concerns that pertain to specific deviations from the normal routine. Normal (or usual) is the key word here. A concern of this nature would be, "Usually, I have the children take turns and answer individually, but I decided to see what would happen if I let them answer as a group."

Time

Pacing. This refers to those concerns which relate to the speed at which material is being presented, the flow of teacher questions and student responses, the amount of "wait time" allowed, and the amount of time students are disengaged from tasks. An example of this type of concern is the following comment, "I gave them the answer myself because I felt things were moving too slowly. I was losing their attention."

Time-block restriction. Included here are those concerns that focus on accomplishing a certain amount by the end of the period in which the lesson is taking place. For instance, "I wanted to finish the story by the end of the lesson, so I asked fewer questions between sections."

Time-related goals. This refers to those concerns having to do with long-range expectations for things like the amount of material presented, the number of assignments completed, and the number of pages done in a workbook. An example of this sort of concern is, "I skipped enrichment work today, and we worked in their workbook so it'd be done by winter vacation."

Materials

Instructional systems. This addresses concerns that relate to the various approaches to instruction involving standard textbooks, workbooks, charts, flash cards, and other teaching materials packaged and marketed on a wide scale. For instance, such a concern is, "It's important that we work on the correct chart, so I decided to go to my desk and check it."

Teacher-developed aids. This includes those concerns that focus on materials the teacher had made, purchased, or altered to enhance a lesson: Things such as a vocabulary game created by the teacher, special flash cards tailored to each individual student's needs, special dittoed worksheets. As an example, one teacher commented, "I hoped that the children would like the game, but I decided it was too distracting so I put it away."

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